

ONCOLOGY TREATMENT OUTCOMES AND PATIENTS SURVIVAL ANALYSIS

COURSE NAME : COMPUTER FUNDAMENTALS & OFFICE APPLICATION



SUBMITTED TO

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Sample data of Onchology patients

Patient_ID	Age	Gender	Cancer_Type	Cancer_Stage	Treatment_Type	Treatment_Outcome	Survival_Months
P0001	32	Female	Leukemia	Stage II	Surgery	Progressive Disease	13
P0002	21	Other	Lung Cancer	Stage III	Targeted Therapy	Progressive Disease	73
P0003	53	Male	Bladder Cancer	Stage I	Radiation Therapy	Partial Remission	93
P0004	49	Male	Bladder Cancer	Stage IV	Chemotherapy	Complete Remission	80
P0005	46	Female	Lung Cancer	Stage I	Hormone Therapy	Complete Remission	67
P0006	35	Other	Pancreatic Cancer	Stage III	Chemotherapy	Partial Remission	11
P0007	31	Female	Pancreatic Cancer	Stage IV	Hormone Therapy	Progressive Disease	61
P0008	87	Female	Melanoma	Stage I	Hormone Therapy	Partial Remission	92
P0009	29	Female	Melanoma	Stage I	Radiation Therapy	Complete Remission	88
P0010	72	Other	Prostate Cancer	Stage II	Radiation Therapy	Partial Remission	77
P0011	22	Male	Prostate Cancer	Stage III	Hormone Therapy	Progressive Disease	119
P0012	21	Female	Bladder Cancer	Stage III	Surgery	Complete Remission	100
P0013	29	Female	Pancreatic Cancer	Stage III	Surgery	Complete Remission	90
P0014	45	Other	Colorectal Cancer	Stage IV	Radiation Therapy	Complete Remission	36
P0015	47	Other	Lung Cancer	Stage II	Chemotherapy	Progressive Disease	54

Questions

Question 1: What is the average survival time for each cancer type?

Question 2 :How many patients are there for each gender and cancer type combination?

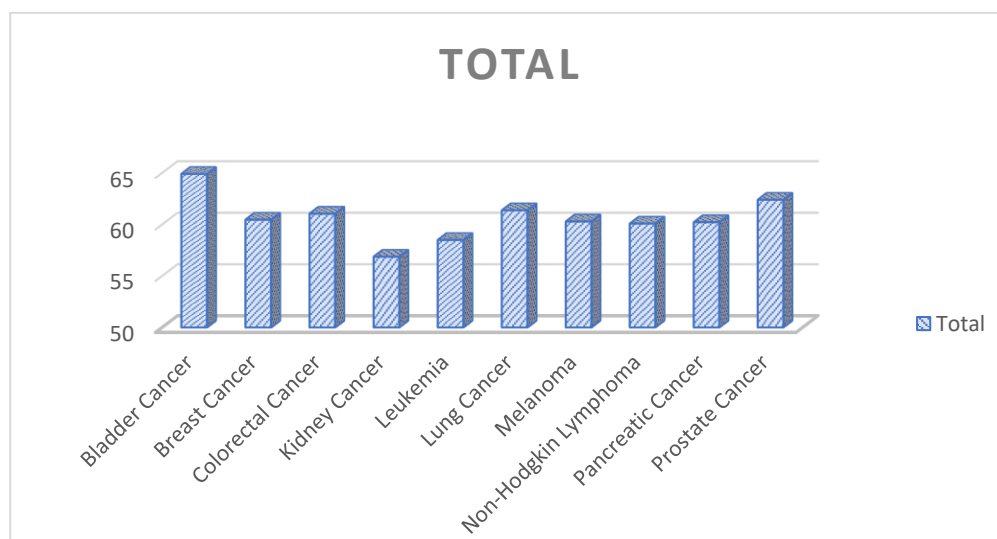
Question 3: What is the average age of patients for each cancer type?

Question 4 : What is the treatment success rate (complete remission) for each type of cancer across different stages?

Question 5 : What is the survival trend (average survival months) for each treatment type and stage of cancer?

Question 1: What is the average survival time for each cancer type?

Row Labels	Average of Survival_Months
Bladder Cancer	64.9009901
Breast Cancer	60.45454545
Colorectal Cancer	61.04040404
Kidney Cancer	56.8627451
Leukemia	58.49038462
Lung Cancer	61.36781609
Melanoma	60.28282828
Non-Hodgkin Lymphoma	60.07619048
Pancreatic Cancer	60.21186441
Prostate Cancer	62.39175258
Grand Total	60.573



Pivot Table Structure:

- 'Cancer_Type' in the rows
- 'Survival_Months' in the values section, using
- 'Average' as the aggregation function.

Detailed Insight and Interpretation: By placing 'Cancer_Type' in the rows, the pivot table groups the data by each type of cancer. 'Survival_Months' in the values section aggregates the survival time for each cancer type, showing the average for every category. This structure allows us to compare survival times across different cancers. Factors like cancer aggressiveness, early detection, and treatment efficacy will impact the average survival time for each type. For instance, cancers with better treatment options, such as skin cancer, may have longer survival times compared to cancers like pancreatic cancer, which is often diagnosed in advanced stages.

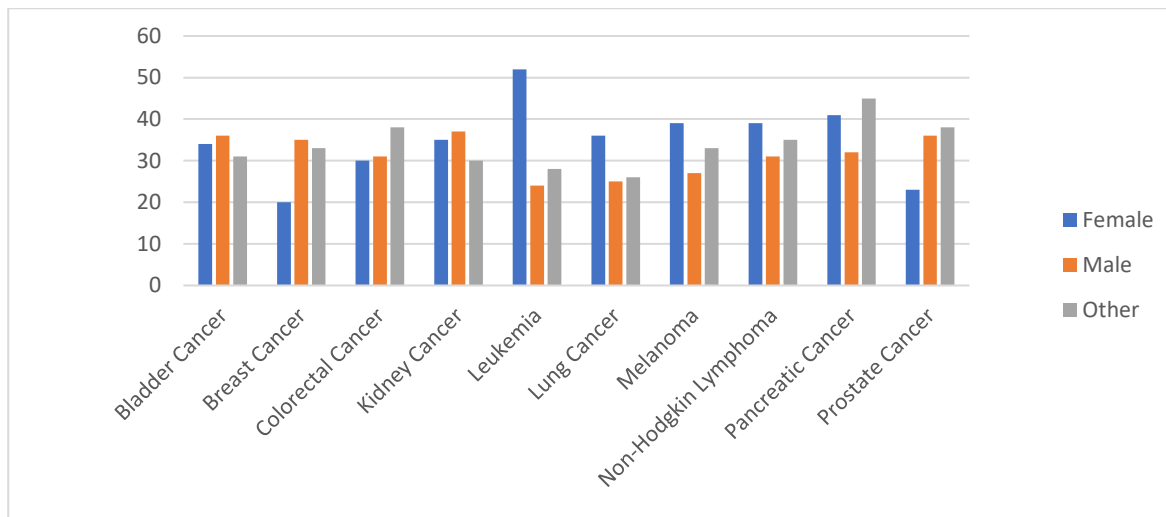
Here is overview of the charts:

- Bladder cancer takes around 64 months for survival which is the largest time in this data.
- Second position takes by Prostate cancer ,it takes around 62 month.
- Breast cancer, colorectal cancer, leukemia, melanoma ,Non Hodgkin lymphoma ,pancreatic cancer takes around 60 month for survival .
- Kidney cancer takes around 58 month in average ,which is the lowest time for survival among those cancer.

Question 2 :How many patients are there for each gender and cancer type combination?

Pivot Table & Charts

Count of Patient_ID	Column Labels			
Row Labels	Female	Male	Other	Grand Total
Bladder Cancer	34	36	31	101
Breast Cancer	20	35	33	88
Colorectal Cancer	30	31	38	99
Kidney Cancer	35	37	30	102
Leukemia	52	24	28	104
Lung Cancer	36	25	26	87
Melanoma	39	27	33	99
Non-Hodgkin Lymphoma	39	31	35	105
Pancreatic Cancer	41	32	45	118
Prostate Cancer	23	36	38	97
Grand Total	349	314	337	1000



Pivot Table Structure

- 'Gender' in the columns
- 'Cancer_Type' in the columns,
- 'Patient_ID' as the value, counting the number of patients.

Insight and Interpretation

By placing 'Gender' in the columns and 'Cancer_Type' in the columns, the pivot table cross tabulates gender with cancer types. The 'Patient_ID' is counted, showing the number of patients for each gender-cancer combination. This setup helps to identify patterns where certain cancers are more prevalent in one gender. For example, breast cancer is likely concentrated in females, while prostate cancer is found in males. The distribution provides insights into how demographic factors like gender might influence cancer prevalence.

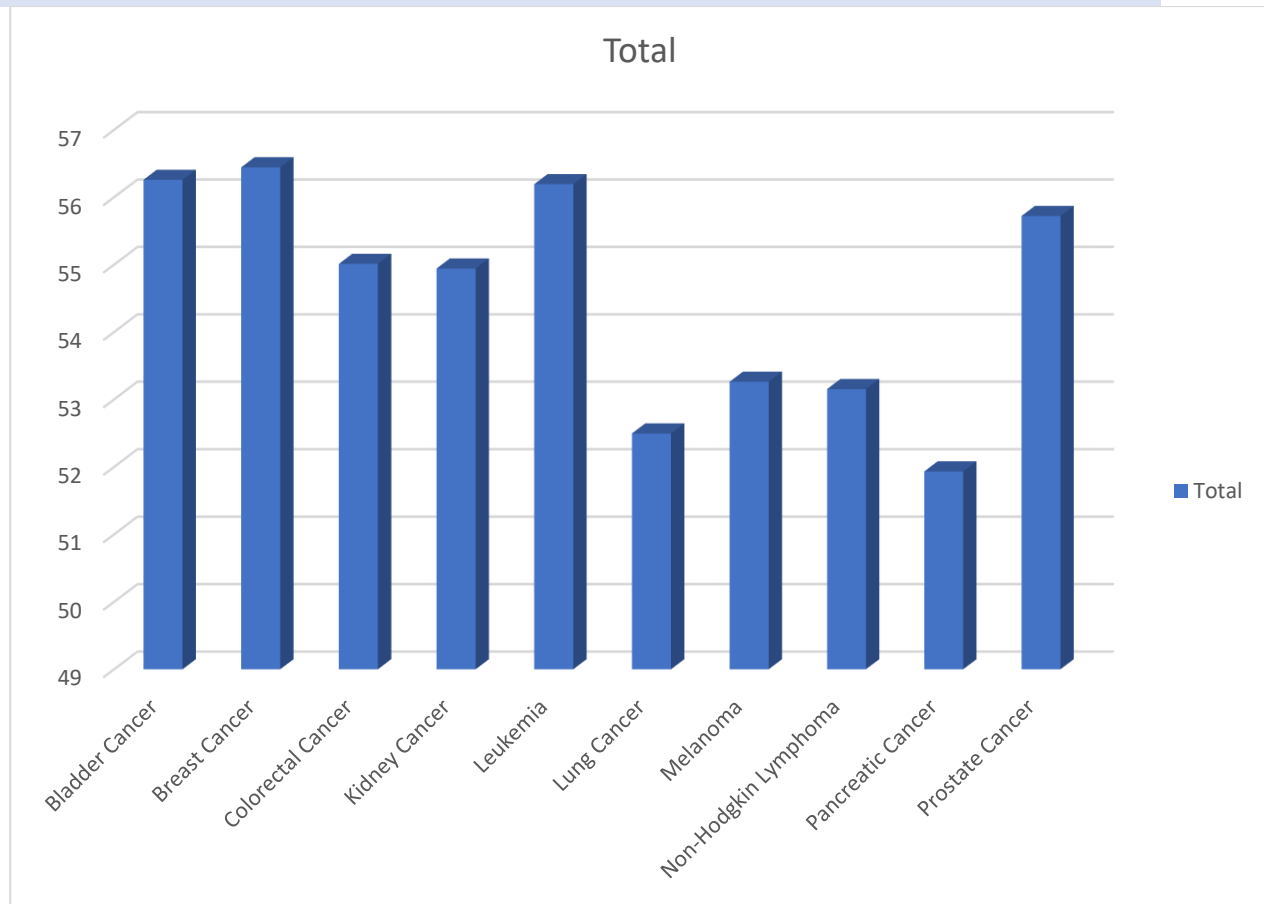
- Leukemia is high in female compared to male .
- Prostate cancer is high in male & other gender.
- Melanoma ,Pancreatic cancer , Non Hodgkin Lymphoma ,Colorectal cancer is high in female compared to male
- Bladder cancer ,kidney cancer is high in both male & others gender compared to female.
- Pancreatic cancer & colorectal occurs most in others gender.

Question 3 : What is the average age of patients for each cancer type?

Pivot Table & charts

Row Labels	Average of Age
Bladder Cancer	56.25742574
Breast Cancer	56.44318182
Colorectal Cancer	55.01010101
Kidney Cancer	54.94117647
Leukemia	56.19230769
Lung Cancer	52.49425287
Melanoma	53.26262626

Non-Hodgkin Lymphoma	53.15238095
Pancreatic Cancer	51.93220339
Prostate Cancer	55.72164948
Grand Total	54.497



Pivot Table Structure

- 'Cancer_Type' in the rows
- 'Age' in the values section, using the 'Average' function.

Detailed Insight and Interpretation

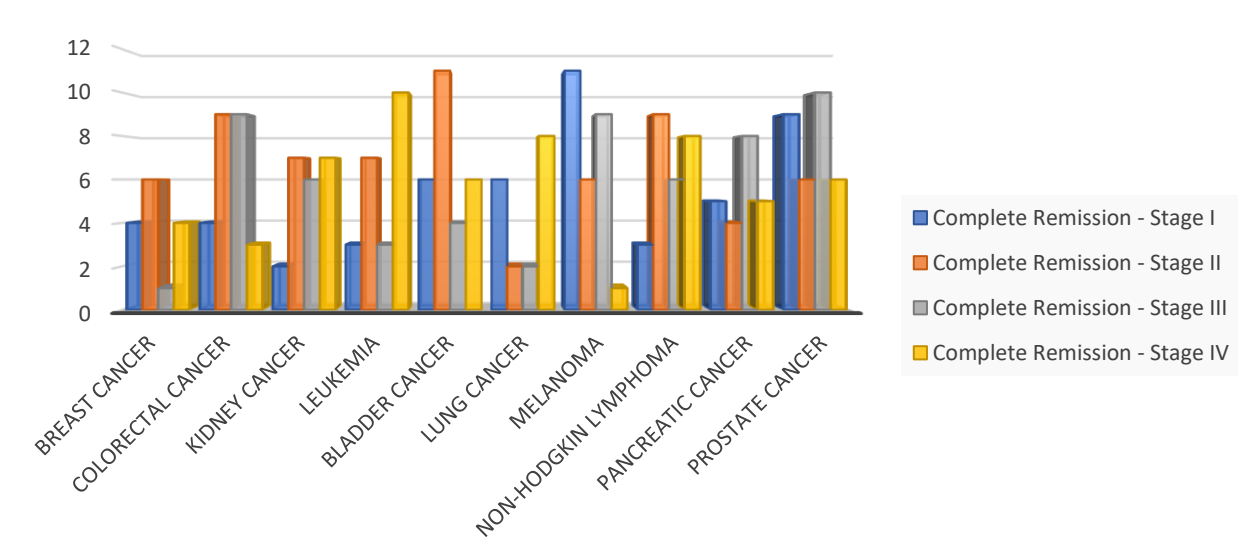
By setting 'Cancer_Type' in the rows, the pivot table groups patients by cancer type. The 'Age' parameter in the values section calculates the average age of patients for each type of cancer. This analysis reveals age patterns associated with cancer types. For instance, younger patients may be more prone to cancers like leukemia, while cancers such as lung or colon cancer may predominantly affect older adults. Such insights help target prevention and screening efforts based on patient demographics. From this table & charts we can see –

- Bladder cancer ,Breasr cancer & Leukemia occurs with people whose age around 56 years.
- Colecrectal cancer, Kidney cancer mostly occurs with people at age around 54 years.
- Melanoma & Non Hodgkin lymphoma is common at the age of 53 years.
- Pancreatic cancer occurs at early age around people whose age around 51 years.

Question 4 : What is the treatment success rate (complete remission) for each type of cancer across different stages?

Count Patient_ID	of	Column Labels				Complete Total	Remission	Grand Total
		Complete Remission	Stage II	Stage III	Stage IV			
Row Labels		Stage I						
Breast Cancer		4	6	1	4	15		15
Colorectal Cancer		4	9	9	3	25		25
Kidney Cancer		2	7	6	7	22		22
Leukemia		3	7	3	10	23		23
Bladder Cancer		6	11	4	6	27		27
Lung Cancer		6	2	2	8	18		18
Melanoma		11	6	9	1	27		27
Non-Hodgkin Lymphoma		3	9	6	8	26		26
Pancreatic Cancer		5	4	8	5	22		22
Prostate Cancer		9	6	10	6	31		31
Grand Total		53	67	58	58	236		236

Chart



Pivot table structure

- 'Cancer_Type' rows
- 'Cancer_Stage' in the columns
- 'Patient_ID', filtering for 'Treatment_Outcome' as 'Complete Remission'.

Detailed Insight and Interpretation

Here, both 'Cancer_Type' placed in the rows & cancer Stages in the columns, organizing the data by cancer type and stage. By filtering the results to count only patients who achieved 'Complete Remission' under 'Treatment_Outcome', we can measure the success of treatments across different stages and cancer types. Early-stage cancers are more likely to show higher remission rates, while late-stage cancers may have lower remission success due to the spread of the disease. This analysis helps in understanding the effectiveness of treatments at various stages of the disease. From the table & charts we can see that-

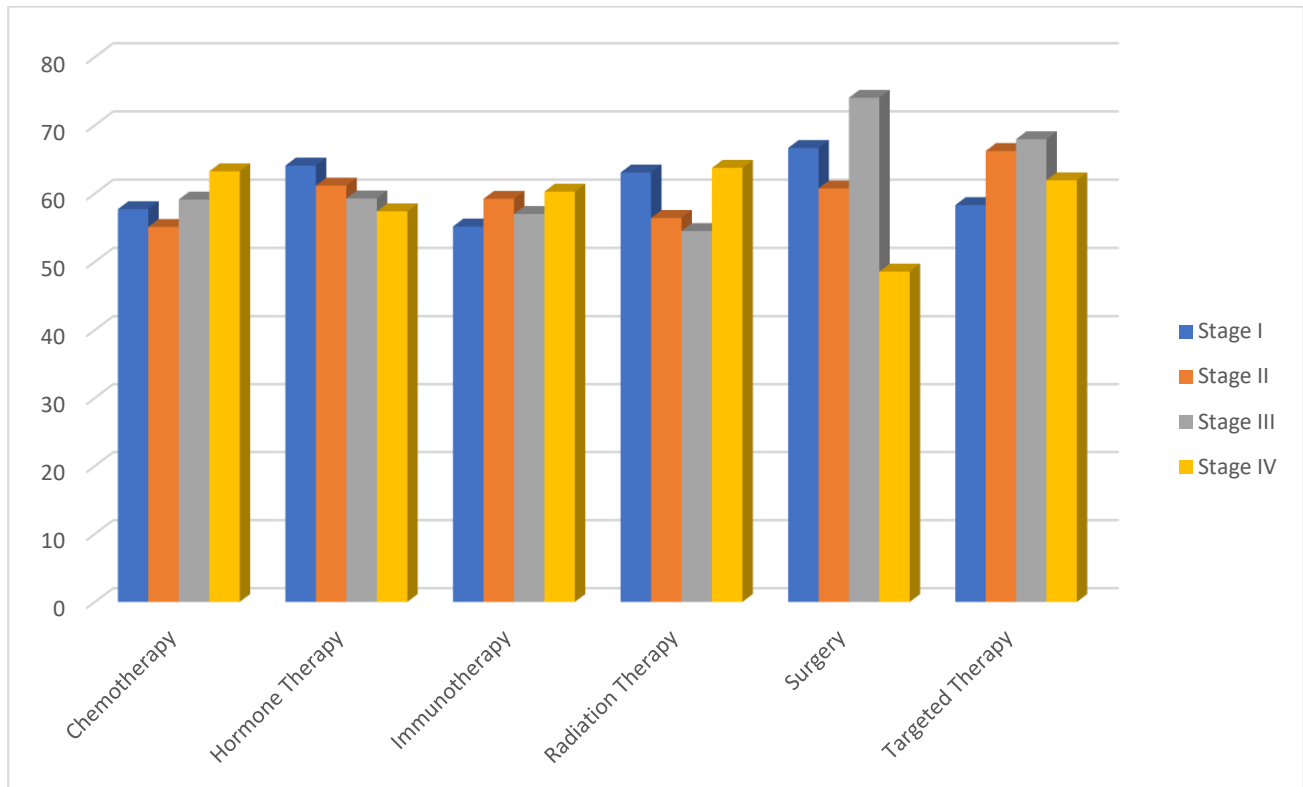
- Treatment success rate of prostate cancer is high compared to others cancer. Also Prostate cancer can complete remission of cancer at the stage 3, which is too good.
- Complete remission of Bladder cancer & Melanoma cancer is second high in this data.
- Colorectal cancer, Leukemia, kidney cancer pancreatic cancer are in moderate level.
- Complete remission level is too few in breast cancer at any stage, But in first stage there is moderate level.
- We also see that complete remission is high in first and second stage compared to third and fourth stage at any cancer.
- There is only leukemia cancer where patients can completely survive at highest number among other cancers in this data.

Question 5 : What is the survival trend (average survival months) for each treatment type and stage of cancer?

Pivot Table for this question

Average Survival_Months	of Column Labels				
Row Labels	Stage I	Stage II	Stage III	Stage IV	Grand Total
Chemotherapy	57.7	55.08823529	59.11111111	63.25581395	59.01851852
Hormone Therapy	64.1	61.16129032	59.26415094	57.39130435	60.38308458
Immunotherapy	55.17073171	59.21621622	57	60.27027027	57.8590604
Radiation Therapy	63.07317073	56.42105263	54.5	63.76190476	59.55279503
Surgery	66.66666667	60.74285714	74.02857143	48.55882353	62.79452055
Targeted Therapy	58.29787234	66.22916667	67.95238095	61.93181818	63.52486188
Grand Total	60.79681275	60.25590551	61.70281124	59.52845528	60.573

Chart



Pivot Table Structure

- 'Treatments' is in row.
- Stages are in columns
- Survival months as value (counting average month of survival)

Insight and Interpretation

This insight reveals how effective different treatments are at extending life. For example, chemotherapy may show better results in early-stage cancers, while immunotherapy may offer extended survival in advanced stages. From the chart and table we can see that-

- Targeted therapy is the most effective treatment for all stage of cancer .
- Surgery is the second highest effective treatment .
- Hormone therapy is in third position for overall stages of cancer.
- Chemotherapy and Radiation therapy is around 60 month of survival month of all stages of cancer.
- Immunotherapy has the lowest success rate in all stage of cancer.
- Surgery is the best option when a person is in stage 3 of any cancer.
- Chemotherapy and radiation therapy gives best result at stage 4 of any cancer.
- In stage 2 targeted therapy plays very good role in surviving. Others also have great impact on treatment.

- Hormone therapy , radiation therAPY AND Surgery is more effective in stage 1 compared to other treatements.

Conclusion

The pivot table analysis provided crucial insights into cancer patient data, helping us understand various relationships between demographic, medical, and treatment factors.

1. Survival Time by Cancer Type:

By analyzing the average survival time across different cancer types, we learned that cancers vary significantly in terms of prognosis. Early detection and treatment effectiveness were key factors influencing survival times.

2. Gender and Cancer Type Distribution:

Cross-tabulating gender with cancer type highlighted gender-specific cancer patterns. This shows the importance of demographic analysis in understanding the prevalence and types of cancer in different populations.

3. Cancer Stage Distribution:

Understanding the distribution of cancer stages revealed insights into the effectiveness of early detection programs. A large number of late-stage diagnoses indicated potential gaps in screening processes.

4. Age and Cancer Type Relationship:

The analysis of average age across cancer types uncovered trends such as younger populations being more prone to certain cancers like leukemia, while older populations had higher incidences of cancers like lung and colon.

5. Treatment Success by Cancer Stage:

Treatment success rates across different stages of cancer highlighted the importance of early diagnosis. Higher remission rates were observed in early stages, indicating that timely intervention plays a critical role in treatment outcomes.

6. Survival Trends by Treatment Type and Stage:

By evaluating survival trends across treatments, it became clear that some treatments are more effective at specific stages of cancer. This shows the need for personalized treatment plans tailored to the stage and type of cancer.

7. Impact of Gender and Age on Treatment Outcomes:

Analyzing how gender and age groups influence treatment outcomes revealed that younger patients tend to recover faster and respond better to treatments, while older patients faced more challenges.

8. Survival in Progressive Disease:

Lastly, the survival distribution for patients with progressive disease highlighted the varying efficacy of treatments even when cancer progression continues. This reinforces the need for innovative treatments that can prolong survival despite disease advancement.

Overall, the pivot table analysis provided valuable insights into the complexities of cancer treatment, patient demographics, and outcomes. It emphasizes the importance of personalized treatment approaches and effective early detection programs to improve cancer survival rates.

This conclusion highlights the key findings from the pivot table analysis and wraps up the assignment with a comprehensive summary of the insights derived from the data.